WHAT IS CLAIMED IS:

1. A magnetoresistive head comprising:

a pinned layer;

a free layer; and

a non-magnetic spacer film formed between the pinned layer and the free layer;

wherein the pinned layer has a first ferromagnetic film and a second ferromagnetic film anti-ferromagnetically coupled to each other by way of an anti-ferromagnetic coupling film; and

a coercivity of the first ferromagnetic film is 200 Oe or more and a coercivity of the second ferromagnetic film is 20 Oe or less.

2. A magnetoresistive head comprising:

a pinned layer;

a free layer; and

a non-magnetic spacer film formed between the pinned layer and the free layer;

wherein the pinned layer has a first ferromagnetic film and a second ferromagnetic film anti-ferromagnetically coupled to each other by way of an anti-ferromagnetic coupling film;

a composition of the first ferromagnetic film is within a range of: $Co_{100-X}Fe_X$ (at%) $40 \leqq X \leqq 80$; and

a composition of the second ferromagnetic film is within a range of: $Co_{100-Y}Fe_Y$ (at%) $0 \leqq Y \leqq 20$.

3. A magnetoresistive head according to claim 1 or 2, wherein the anti-ferromagnetic coupling film is formed of Ru and has a thickness within a range from 3.0 to 4.0 Å.

4. A magnetoresistive head according to claim 1 or 2, wherein a relation between an imaginal thickness DA0 of the first ferromagnetic film that has a magnetic moment equal to a magnetic moment of the second ferromagnetic film and a thickness DA of the first ferromagnetic film satisfies:

$0.0227 \leqq (DA - DA0)/DA0 \leqq 0.136$.

5. A magnetoresistive head according to claim 4, wherein the magnetic moment of the first ferromagnetic film is larger than that of the second ferromagnetic film.

6. A magnetoresistive head according to claim 1 or 2, wherein a layer in contact with the first ferromagnetic film is formed from one of Ru, Ta, Cu, and NiFeCr.

7. A magnetoresistive head according to claim 1 or 2, wherein:

the free layer is on the side of a substrate and the pinned layer is on a side remote from the substrate relative to the free layer; and

wherein the magnetoresistive head has an underlayer adjacent to the free layer, the underlayer having an NiFeCr layer on the side of the substrate.

8. A magnetoresistive head according to claim 3, wherein:

the free layer is on the side of a substrate and the pinned layer is on a side remote from the substrate relative to the free layer; and

wherein the magnetoresistive head has an underlayer adjacent to the free layer, the underlayer having an NiFeCr layer on the side of the substrate.

9. A magnetoresistive head according to claim 4, wherein:

the free layer is on the side of a substrate and the pinned layer is on a side remote from the substrate relative to the free layer; and

wherein the magnetoresistive head has an underlayer adjacent to the free layer, the underlayer having an NiFeCr layer on the side of the substrate.

10. A magnetoresistive head according to claim 5, wherein:

the free layer is on the side of a substrate and the pinned layer is on a side remote from the substrate relative to the free layer; and

wherein the magnetoresistive head has an underlayer adjacent to the free layer, the underlayer having an NiFeCr layer on the side of the substrate.

11. A magnetoresistive head according to claim 6, wherein:

the free layer is on the side of a substrate and the pinned layer is on a side remote from the substrate relative to the free layer; and

wherein the magnetoresistive head has an underlayer adjacent to the free layer, the underlayer having an NiFeCr layer on the side of the substrate.

12. A magnetoresistive head according to claim 1 or 2, wherein:

the pinned layer is on the side of the substrate and the free layer is on a side remote from the substrate relative to the pinned layer; and

wherein an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr and Ru, a stack of NiFeCr, Ru, and NiFe, or a stack of NiFeCr, Ru, NiFe and Cu, in order from the side of the substrate.

13. A magnetoresistive head according to claim 3, wherein:

the pinned layer is on the side of the substrate and the free layer is on a side remote from the substrate relative to the pinned layer; and

wherein an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr and Ru, a stack of NiFeCr, Ru, and NiFe, or a stack of NiFeCr, Ru, NiFe and Cu, in order from the side of the substrate.

14. A magnetoresistive head according to claim 4, wherein:

the pinned layer is on the side of the substrate and the free layer is on a side remote from the substrate relative to the pinned layer; and

wherein an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr and Ru, a stack of NiFeCr, Ru, and NiFe, or a stack of NiFeCr, Ru, NiFe and Cu, in order from the side of the substrate.

15. A magnetoresistive head according to claim 5, wherein:

the pinned layer is on the side of the substrate and the free layer is on a side remote from the substrate relative to the pinned layer; and

wherein an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr and Ru, a stack of NiFeCr, Ru, and NiFe, or a stack of NiFeCr, Ru, NiFe and Cu, in order from the side of the substrate.

16. A magnetoresistive head according to claim 6, wherein:

the pinned layer is on the side of the substrate and the free layer is on a side remote from the substrate relative to the pinned layer; and

wherein an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr and Ru, a stack of NiFeCr, Ru, and NiFe, or a stack of NiFeCr, Ru, NiFe and Cu, in order from the side of the substrate.

17. A magnetoresistive head according to claim 1 or 2, wherein:

the fixed layer is on the side of a substrate and the free layer is on a side remote from the substrate relative to the fixed layer; and

an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr, NiFe, PtMn and Ru, or a stack of NiFeCr, NiFe, PtMn and Cu, in order from the side of the substrate.

18. A magnetoresistive head according to claim 3, wherein:

the fixed layer is on the side of a substrate and the free layer is on a side remote from the substrate relative to the fixed layer; and

an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr, NiFe, PtMn and Ru, or a stack of NiFeCr, NiFe, PtMn and Cu, in order from the side of the substrate.

19. A magnetoresistive head according to claim 4, wherein:

the fixed layer is on the side of a substrate and the free layer is on a side remote from the substrate relative to the fixed layer; and

an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr, NiFe, PtMn and Ru, or a stack of NiFeCr, NiFe, PtMn and Cu, in order from the side of the substrate.

20. A magnetoresistive head according to claim 5, wherein:

the fixed layer is on the side of a substrate and the free layer is on a side remote from the substrate relative to the fixed layer; and

an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr, NiFe, PtMn and Ru, or a stack of NiFeCr, NiFe, PtMn and Cu, in order from the side of the substrate.

21. A magnetoresistive head according to claim 6, wherein:

the fixed layer is on the side of a substrate and the free layer is on a side remote from the substrate relative to the fixed layer; and

an underlayer adjacent to the first ferromagnetic film on the side of the substrate comprises a stack of NiFeCr, NiFe, PtMn and Ru, or a stack of NiFeCr, NiFe, PtMn and Cu, in order from the side of the substrate.

22. A magnetoresistive head comprising:

a first pinned layer;

a second pinned layer;

a free layer;

a non-magnetic spacer film formed between the first pinned layer and the free layer; and

another non-magnetic spacer film formed between the second pinned layer and the free layer;

wherein each of the first and the second pinned layer has a first ferromagnetic film and a second ferromagnetic film anti-ferromagnetically coupled with each other by way of an anti-ferromagnetic coupling film; and

a coercivity of the first ferromagnetic film is 200 Oe or more and a coercivity of the second magnetic layer is 20 Oe or less.

23. A magnetoresistive head comprising:

a first pinned layer;

a second pinned layer;

a free layer;

a non-magnetic spacer film formed between the first pinned layer and the free layer; and

another non-magnetic spacer film formed between the second pinned layer and the free layer;

wherein each of the first and the second pinned layer has a first ferromagnetic film and a second ferromagnetic film anti-ferromagnetically coupled with each other by way of an anti-ferromagnetic coupling film; and

wherein a composition of each of the first ferromagnetic films disposed in each of the first pinned layer and the second pinned layer is within a range of: $Co_{100-X}Fe_X$ (at%) $40 \leqq X \leqq 80$, and

a composition of the second ferromagnetic film is within a range of: $Co_{100-Y}Fe_Y$ (at%) $0 \leqq Y \leqq 20$.

24. A magnetoresistive head according to claim 22 or 23, wherein each of the anti-ferromagnetic coupling films of the first pinned layer and the second pinned layer is made of Ru and has a thickness within a range from 3.0 to 4.0 Å.

25. A magnetoresistive head according to claim 22 or 23, wherein a relation between the imaginal thickness DA0 of the first ferromagnetic film that has a magnetic moment equal to the magnetic moment of the second ferromagnetic film and a thickness DA of the first ferromagnetic film satisfies:

$0.0227 \leqq (DA - DA0)/DA0 \leqq 0.136$.

26. A magnetoresistive head according to claim 25, wherein the magnetic moment of the first ferromagnetic film is larger than that of the second ferromagnetic film.

27. A method of manufacturing a magnetoresistive head comprising a pinned layer having a first ferromagnetic film and a second ferromagnetic film anti-ferromagnetically coupled with each other by way of an anti-ferromagnetic coupling film, a free layer and a permanent magnet film disposed at an end of the free layer, said method comprising:

a first magnetic field application step of applying a magnetic field in a desired direction different from a direction of a magnetic moment magnetized to the pinned layer; and

a second magnetic field application step of applying a magnetic field in a direction different from the direction of the magnetic field application in the first magnetic field application step.

28. A method of manufacturing a magnetoresistive head according to claim 27, wherein the following relation is satisfied:

$$H1 \geqq 0.4\,Hs$$

$$Hc \leqq H2 \leqq 0.35\,Hs,$$

where

Hs is a saturation magnetic filed that brings respective magnetic moments of the first ferromagnetic film and the second ferromagnetic film antiparallel to each other into a parallel state,

Hc is the coercivity of the permanent magnetic layer,

H1 is a magnitude of an application magnetic field in the first magnetic field application step, and

H2 is a magnitude of an application magnetic field in the step of applying the second magnetic field.